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Division of Wildlife Conservation

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1 July 1997 – 1 September 1998

ALASKA WILDLIFE HABITAT ENHANCEMENT

Mary V. Hicks, Editor

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Study 20.0
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PERFORMANCE REPORT

STATE: Alaska

STUDY No.: 2.0

GRANT No.: W-28-1

PROJECT TITLE: Alaska Wildlife Habitat Enhancement

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REPORTING PERIOD: 1 July 1995–1 September 1998

BACKGROUND: The Region III Habitat Enhancement Program was initiated in 1995 after the state legislature established a state funded Capital Improvement Project (CIP) for this purpose in 1994. A second CIP, containing both federal and state funds, was established by the state legislature in 1996 to continue and extend the program. This report will summarize accomplishments for the period 1 July 1995 through 1 September 1998. A more thorough report on these project activities is being prepared for distribution at a later date.

PROJECT OBJECTIVES

- 1 Work with state and federal agencies and the private sector to plan, coordinate, and implement forest management activities to maintain or improve wildlife habitat.
- 2 Encourage prescribed burning and other appropriate forestry practices in developed areas to offset the negative ecological effects of increased suppression of natural fires.
- 3 Evaluate biological and economic efficacy of prescribed burning and other forestry practices for maintaining or enhancing wildlife habitat.

PROJECT ACTIVITIES

- 1 Landscape Scale Prescribed Fire. Plan and implement prescribed fires on a landscape scale (thousands of acres) to maintain or improve wildlife habitat, forest health and ecosystem diversity, and to reduce the potential for catastrophic wildland fires. This is a joint Alaska Department of Fish and Game, Division of Wildlife Conservation (DWC), and Alaska Department of Natural Resources, Division of Forestry (DOF) activity. Cooperators have included the Alaska Department of Natural Resources–Division of Lands (DOL), the Toghothele Native Corporation, the U.S. Fish and Wildlife Service (FWS) and the Alaska Department of Public Safety–Division of Fish and Wildlife Protection (F&WP).
- 2 Postlogging Site Treatment. Implement post-logging treatments to enhance wildlife and forest values, monitor treatment effects and develop forest management recommendations. Treatments include prescribed fire, soil scarification and willow planting. This is a joint DWC and DOF activity. Cooperators have included the Bureau of Land Management - Alaska Fire Service (BLM - AFS).

- 3 Ruffed Grouse Habitat Enhancement. Create and maintain optimal habitat conditions for the production of ruffed grouse in areas readily accessible to Fairbanks and Nenana hunters. Treatments include felling and prescribed fire. This is a joint DOF, Ruffed Grouse Society (RGS), and DWC activity.
- 4 Moose Habitat Enhancement. Mechanical crushing or shearing is used to enhance availability, quality and quantity of moose browse species, especially feltleaf willow, in important moose wintering areas. This DWC activity has involved the Fairbanks North Star Borough and DOF.
- 5 Prescribed Burning Protocol. Prepare documentation to support categorical exclusion of the state's prescribed fire program from the National Environmental Policy Act (NEPA) process under FWS guidelines. This is a joint DWC and DOF activity.

ACCOMPLISHMENTS DURING THE PROJECT SEGMENT PERIOD

Table 1 Summary of project accomplishments, 1 July 1995–1 September 1998

Fiscal	<u>Prescribed Burning</u>		<u>Aspen Felling</u>		<u>Willow Crushing</u>		<u>Willow Planting</u>		Total	Forest
Year* (FY)	Nr Burns	Nr Acres	Nr Units	Nr Acres	Nr Areas	Nr Acres	Nr Plants	Nr Acres	Acres per FY	Road (miles)
99**	1	52,000	10	122	0	0	4,000	8	52,130	0.0
98	5	30	5	71	1	244	6,000	15	360	0.0
97	2	60	6	49	1	207	4,000	10	326	2.5
96	1	5	4	30	1	293	3,000	8	336	2.0
TOTALS:	9	52,095	25	272	3	744	17,000	41	53,152	4.5

* 1 July through 30 June

** Only represents totals to 1 September 1998

Landscape Scale Prescribed Fire

Since inception of the habitat enhancement project, 1 landscape scale prescribed burn has been completed and plans have been approved for 2 more. These large prescribed fires primarily enhance vegetative diversity and productivity to offset seral changes resulting from decades of fire suppression.

I worked with Tok DWC and DOF staff during winter 1997–98 to prepare the East Fork burn plan (Kraemer and Haggstrom 1998) and obtain required land use and open burning permits. The plan was approved by DWC, DOF and DOL on 1 June 1998. Our primary wildlife objective in doing this burn was to improve habitat conditions for moose. Another objective was to restore

forest diversity to reduce fuel continuity. Unbroken expanses of older, spruce-dominated forest increase the tendency for large, less manageable wildland fire during periods of extreme burning conditions.

Tok area staff from DOF, Tetlin National Wildlife Refuge, F&WP, and DWC cooperated to conduct the East Fork burn on 21 July 1998. We used aerial firing techniques to burn vegetation over a large area in a relatively short time, create desired burning characteristics, influence direction and rate of fire spread, and establish a strong convection column to carry smoke to high altitudes for dispersal. A forecasted change to damper weather was used to limit burn duration and fire size.

Firing proceeded as planned. Judicious application of aerial ignition devices allowed most of the desired burn objective to be achieved during the single day that suitable conditions prevailed. The strong convection column created by the firing carried smoke to an estimated 20,000–30,000 ft altitude where winds from the approaching weather front rapidly carried it over populated areas without causing any significant problems. We achieved a good burn mosaic; unburned areas were interspersed among burned areas of varying severity.

The final burn perimeter included approximately 52,000 acres. Planning and implementation of this burn cost ADF&G about \$16,356.00, excluding DWC personnel costs.

We prepared the western Tanana Flats burn (Haggstrom and Kurth 1996a) plan during summer 1995 and amended it during 1996. Most land within the planning area is either owned by the state or the Toghoththele Native Corporation. The plan provides for a series of 10,000 to 20,000 acre prescribed fires to enhance vegetative diversity and productivity to offset seral changes from decades of fire suppression. Although these changes are needed to sustain diverse, productive populations of all wildlife, they are most urgently needed to sustain the fairly large moose population. The DOF will use these burns to manage forest fuels and reduce fire hazards to communities and homes along the Parks Highway. The Toghoththele Native Corporation is interested in restoring moose hunting opportunities in traditional hunting areas near Nenana. We are still waiting for proper conditions to conduct the first burn in this 291,300 acre planning area. A Public Information Plan and detailed Operational Plan were prepared during 1997. On-site weather data have been collected and analyzed for 3 summers.

We also worked with the DOF and the U.S. Fish and Wildlife Service during 1996 to prepare a burn plan for the Natohona Creek drainage approximately 25 miles southwest of Tok (Kraemer and Butteri 1996). The main purpose for this burn is to increase habitat diversity and enhance browse conditions for moose. The burn would rejuvenate about 2,100 acres of mature spruce/hardwood forest near timberline in the headwaters of the Tok River. Desired burning conditions were not obtained during either 1996 or 1997. In the interim, we worked with Tok Area Forestry and Northern Region DOF staff on preparation of a timber sale in the Tok River drainage. The Natohona burn will probably not be needed if the timber sale is approved.

POSTLOGGING SITE TREATMENT

PRESCRIBED FIRE

During late winter 1995–96, we worked with DOF and the Citizen's Advisory Committee to prepare a Forest Land Use Plan and Prescribed Burn Plan for a 5-acre site along the nature trail on the Creamer's Field Migratory Waterfowl Refuge in Fairbanks. Our primary intent is to demonstrate the important role that site disturbance plays in perpetuating the boreal forest ecosystem. The nature trail is a popular field trip destination for many local teachers. Many visitors and local residents also use the trail.

The Forest Land Use Plan and Prescribed Burn Plan for Creamer's Burn #1 were approved on 8 March and 27 May 1996, respectively (Patten and Kurth 1996). During April 1996, most of the trees and shrubs were cut by a local logger in exchange for the birch logs. Crews then prepared the site for burning by clearing a fuel break, consolidating slash fuels near the ground, pre-positioning pumps and water hose, and black-lining (burning fine fuels) the fuel break. DOF and AFS fire crews successfully completed the burn on 31 May, just 2 days before the disastrous Miller's Reach wildland fire began near Big Lake.

A plan for a second prescribed fire (Creamer's Burn #2) was approved on 27 May 1997 (Patten and Kurth 1997). Goals were similar to those for Creamer's Burn #1, but the educational component was less a priority because the site is off the public trail system. The 7.6-acre burn site is on the northeast corner of the same birch stand containing Creamer's Burn #1, about 0.4 miles away. A contractor felled the paper birch and willow, and community service workers cleared the fuel break. Felled birch were not removed from the burn site. Fire staff from the DOF pre-positioned pumps and hose lines and black-lined the fuel break. DOF and AFS fire crews successfully completed the burn on 17 June.

We have also worked with DOF since 1995 to develop a program to treat logged sites along the Standard Creek Road. Here, as in other areas near the road system in the Tanana Basin, very few stands are less than 40 years old because of past fire suppression efforts to protect people, developments, and timber resources. Young stands, especially those less than 30 years old, are a very important habitat component for many species of wildlife. Our goal is to improve wildlife habitat following logging by creating conditions more suited for establishment of forbs and deciduous shrubs and tree seedlings. Broadcast burning of the slash or mechanical scarification will be used to improve seedbed conditions and retard joint grass competition.

In early 1996, planning was initiated for 2 prescribed burns, totaling 90 acres in timber sales NC-904-F and NC-1085-F. Logging slash was much deeper in sale NC-904-F than in sale NC-1085-F. Felled white spruce had been limbed in place in sale NC-904-F. The felled white spruce in sale NC-1085-F had been skidded whole to the roadside where limbs and tops were removed and burned in piles to reduce potential spruce beetle problems.

Our original intent was to compare postburn results on the 2 sites. However, DOF fire staff eventually decided not to burn timber sale NC-904-F because of the added risk. The burn plan was not finished and the unit was planted with white spruce seedlings.

The burn plan for the 52-acre logged portion of sale NC-1085-F was approved on 24 July 1996 (Haggstrom and Kurth 1996b). On 25 July 1996, fire crews from DOF and AFS successfully completed the burn. Pre-burn calculations of predicted fire behavior (22-ft head fire flame length and 18-ft/min rate of spread) proved fairly accurate. This burn provided valuable experience that will serve us well during future prescribed fire efforts.

Despite the relatively light fuel load, we accomplished our objective of reducing duff thickness over a large portion of the burned site. I estimated that burning reduced the duff layer to less than two inches over 75% of the site. Mineral soil was exposed in 10% of the area. Examination during summer 1997 indicated that joint grass was temporarily absent where approximately two inches or less duff remained, but lush growth was noted where duff depth exceeded two inches.

SCARIFICATION

Funding was provided in 1998 for DOF to mechanically scarify about 200 acres over a 2-year period. Scarification enhances establishment of deciduous tree and shrub seedlings in logging areas not treated with prescribed fire. Work is scheduled to begin during fall 1998.

WILLOW PLANTING

We have experimented with willow planting in logged areas since summer 1995 (Table 1). Approximately 17,000 felt-leaf willow cuttings were planted on 41 acres of logged upland white spruce stands. Feltleaf willow was used exclusively because it is native to the area, fast growing, and a highly preferred browse species for moose.

Few willow plants remain in the understory by the time white spruce dominated stands are cut for timber. Planting may be a feasible way to enhance availability of this important browse plant in timber harvest areas and enhance white spruce seedling survival. It is hoped that shading from the fast growing willow will provide relief from the extremely hot temperatures that sometimes occur in clearcuts and reduce the growth of joint grass around nearby white spruce seedlings.

Our intent is to annually plant willow cuttings on approximately 10 acres of white spruce clearcuts and monitor their growth and survival. Willows are cut late in their winter dormant period to reduce storage time between cutting and planting. The bundled willows are then stored under snow and sawdust to slow growth and desiccation until needed for planting in June or July. The willows are uncovered and cut into 12-inch lengths just before the scheduled planting date. The cuttings are planted vertically, top end up, with three fourths their length below ground level.

During 1995 volunteers from the Fort Wainwright Rod and Gun Club, Safari Club International, the Ruffed Grouse Society, and DOF student interns assisted ADF&G and DOF staff with planting. Since then, the DOF has contracted the willow planting with the same private crews it uses to plant white spruce seedlings in logged areas.

RUFFED GROUSE HABITAT ENHANCEMENT

In 1994 the DOF established the 6000-acre Nenana Ridge Ruffed Grouse Project Area in the Tanana Valley State Forest. The DOF, DWC, and RGS have committed to long-term management of the area to improve forest habitat for grouse and create better forest road access

for hunters and managers. Our habitat goal is to create a rich mixture of different aged aspen stands to meet the varied seasonal needs of ruffed grouse for food, cover, and drumming and nesting sites. This will be accomplished by top-killing mature aspen to stimulate root suckering on closely spaced 3–25-acre treatment units using either mechanical felling methods or prescribed burning. Our objective is to treat at least 200 acres each decade. The Nenana Ridge project area is located approximately 33 miles west-southwest of downtown Fairbanks.

A second project area was established during fall 1997. The Two Rivers Ruffed Grouse Project Area is located approximately 21 miles east of downtown Fairbanks on the north side of Chena Hot Springs road. Goals and objectives for the Two Rivers project area are similar to those for the Nenana Ridge project area.

By fall 1998, a combined total of about 295 acres (29 units) had been treated. Treatment units range in size from 3.7 to 23.8 acres ($\bar{x} = 10.2$).

A review of the project and literature relating to aspen management for ruffed grouse was completed in June 1998 (Fox 1998*a,b*). The purpose of this review was to begin developing a vegetation sampling protocol to assess vegetative response to our treatment efforts and compare those results with published characteristics for optimum ruffed grouse habitat. During summer 1999 we hope to begin systematically assessing the results of past treatments.

MECHANICAL FELLING

In most places, aspen have enough value that operators bid for the opportunity to harvest the trees and sale receipts offset program costs. However, there is virtually no market demand for aspen in Interior Alaska, so we must pay to have aspen felled. A competitive bid process is used to award the contracts. Felling is currently costing about \$230.00 per acre.

Mechanical felling of aspen was initiated at the Nenana Ridge project area in 1995 and at the Two Rivers project area during 1998. In fall 1995, a feller–buncher was used to fell aspen at the Nenana Ridge project area. However, felling has been done with chain saws in both project areas since then. By fall 1998, aspen felling at the Nenana Ridge and Two Rivers project areas had totaled 230.9 and 42.1 acres, respectively.

PRESCRIBED BURNING

Mechanically felled aspen are left on-site, since there is currently little market demand for aspen in Interior Alaska. Although this predicament makes aspen management expensive and poses potential problems for ruffed grouse management, it has one advantage that is not normally available to managers elsewhere. Without a market for the aspen, we are free to consider prescribed burning of standing aspen as an alternative to mechanical felling. Prescribed burning may have advantages over cutting, either in terms of lower treatment costs or improved post-treatment results. Before initiation of effective fire suppression to protect timber values in managed forests, wildland fires usually perpetuated aspen stands. Aspen are well adapted to fire disturbance and burning provides additional ecological benefits over clearcutting. However, experience in Canada and elsewhere indicates possible limited opportunities to achieve the type of burning needed to optimize suckering. Our primary goal is to evaluate the efficacy of burning

as an alternative to mechanical felling in ruffed grouse habitat management. A secondary goal is to develop expertise and experience with prescribed fire.

A prescribed burn plan was approved 23 April 1998 for the Nenana Ridge project area (Patten, Haggstrom and Kurth 1998). Subsequently, we conducted 4 test burns between 15 and 21 May 1998. Burn units were laid out in relatively pure aspen stands with very little spruce in the understory to reduce potential control problems while fire crews gain experience with prescribed burning. Burn units varied in size from 3.7 to 6.4 acres ($\bar{x} = 5.4$). A total of 21.6 acres were burned. Costs charged to the Habitat Enhancement Project totaled \$8,362.44 or \$387.15 per acre.

Two of the 4 sites burned hot enough to uniformly scorch most of the aspen on the sites. Extensive root suckering was observed on these burn units during the subsequent growing season. Tree scorch and subsequent suckering were minimal on the remaining 2 sites which burned under less optimal conditions. Burn units for spring 1999 will be larger and more elongated with more slope. The burn prescription will be modified to make it easier for fire crews to achieve the type of fire behavior necessary to meet burn objectives. We will also attempt to implement a more systematic monitoring effort to identify and evaluate conditions and methods conducive to our management objectives.

ACCESS IMPROVEMENT

During 1995 and 1996, a total of 4.5 miles of forest road was constructed in the Nenana Ridge project area by S & K Farms of Delta Junction to facilitate management activities and improve hunter access. This included construction of a 1.6 mile extension of the existing Upper Road along the ridgeline in October 1995 and another 0.7 mile extension of the Upper Road during October 1996, and construction of a 1.8 mile Lower Road during October 1996. The Lower Road was constructed along the bottom of the ridge roughly parallel to and approximately 0.5–0.7 miles from the Upper Road. Turnouts 12-ft in width were required at 1000-ft intervals.

Forest road extensions were built for approximately \$2000 per mile for a total cost of approximately \$9000. Federal funds were not used for these access improvements.

MOOSE HABITAT ENHANCEMENT

We have completed 3 projects since 1996 designed specifically to enhance existing moose habitat by mechanically treating aging stands, primarily willow. Our main objective is to stimulate production of new shoots on shrub and tree species used by moose for winter browse and delay the natural conversion of shrub stands to tree-dominated forest. To date, approximately 744 acres have been treated (Table 1).

GOLDSTREAM PUBLIC USE AREA

The first area treated was in the Goldstream Public Use Area located 5.5 miles northwest of downtown Fairbanks (Haggstrom 1996). Feltleaf, Bebb's, and littletree willows on the site were 65–75 years old. About 75% of the stems appeared dead, giving the stands a gray appearance even when leafed out during summer. Many live stems were also too tall for moose to forage on and too large for them to push over or break down.

S & K Farms in Delta Junction bid \$59.99 per acre to bulldoze and was awarded the contract. The other 11 bids received ranged as high as \$264.00 per acre. S & K Farms used an early 1950s 195 HP D-8 Caterpillar™ bulldozer that weighed 44,100 lbs with its standard 14 ft wide cable-operated blade. Since willows sprout from the root crown, the bulldozer's blade was kept at least 1 ft above the ground surface to avoid uprooting or breaking stems near their base. Over a 17-day period (5–21 March 1996), willows were broken over or crushed on 293 acres at a cost of \$17,577.

Opening the canopy produced luxurious growth of forbs and grass during the first summer following treatment. New shoots rapidly developed from the root crowns and broken over stems of the crushed feltleaf and littletree willows. Crushed feltleaf and littletree willows produced 4–5 ft and 3–4 ft shoots, respectively, by mid-August 1996. Moose had browsed on virtually all the feltleaf and littletree willow stems checked during summer 1997. In contrast, very little sprouting was observed in the crushed Bebb's willow stands. Tall, dense joint grass was the dominant feature in these areas by midsummer 1997.

HERITAGE FOREST EDUCATION AND RECREATION SITE

A second moose habitat enhancement project was conducted at the Heritage Forest Education and Recreation Site (formerly known as Heritage Park Recreation and Outdoor School Site) along the Chena River approximately 12 miles east of downtown Fairbanks during 1997. This site is managed by the Fairbanks North Star Borough under lease from the BLM.

As in 1996, a bulldozer was used to treat vegetation on the site. However, there were several important differences: (1) the vegetation was shear-cut near its base with a specially designed blade; (2) mid-successional hardwood forest was treated in addition to stands of decadent willow and (3) the vegetative treatments were intended to benefit ruffed and sharp-tailed grouse as well as moose.

Trees and shrubs in the treated areas were about 50 years old. Three general habitat types were included: (1) midsuccessional aspen stands with a willow component in the understory; (2) decadent stands of willow and (3) midsuccessional birch stands with a willow component in the understory. The primary species involved are aspen, Bebb's willow, feltleaf willow, and paper birch. Most of the aspen and birch ranged in size from 1–6 inch dbh, although some were as large as 12 in dbh.

Kiehl's Welding in North Pole bid \$69.00 per acre for the dozer work involved in this job and was subsequently awarded the contract. The other 4 bids received ranged as high as \$125.00 per acre. Kiehl's Welding used a 270 HP D8H 46A Caterpillar™ dozer with a 14 ft hydraulically operated Rome K/G Shear Blade. We requested bids for dozers with shear blades because the standard dozer blade uproots young aspen and birch trees rather than breaking them off.

Over a 15-day period (24 March–7 April 1997), 207 acres were shear-cut at a cost of \$15,870.00. Of the 16 treatment units, 11 (122.4 acres) contained primarily willow, 4 (72.5 acres) contained small diameter aspen with a willow understory, and 1 (11.1 acres) contained small diameter paper birch with a willow understory. The units varied in size from 3.0 to 32.4 acres (\bar{x} = 12.9 acres). Overall, an average of 2.2 acres were shear-cut per hour.

The shear blade worked exceptionally well in the aspen stands. The blade easily cut through the soft, small diameter aspen trees without uprooting or splitting them. However, the shear blade worked only moderately well in the paper birch stand. Although the birch trees were also relatively small in diameter, their harder wood made shearing less effective. Acceptable performance was achieved with the shear blade during below freezing temperatures, but the blade split or uprooted many of the birch trees when afternoon temperatures climbed into the upper 50s and low 60s near the end of the job.

The dense mats of bent over and snow covered willow were also hard to shear on warm afternoons. The small willow stems quickly became wet and pliable in the heat and resisted shearing. Many of the willows were uprooted, split, or sheared too near their crowns. The following summer this reduced sprouting.

Moose browsed heavily on the new shoots that grew from the treated willow, aspen and birch. Willow were most extensively used. Moose had browsed on approximately 90–100 percent of the new willow shoots examined.

TOK RIVER

A bulldozer was used to crush and break overaging willows on approximately 244 acres in the Tok River drainage approximately 19 miles southeast of Tok. Approximately 10 units, varying in size from 2 to 79 acres each, were treated during late March 1998. Most of the vegetation in the treatment units was 10–20 ft tall feltleaf willow. Many of the willow stems were 5–8 inches in diameter. These willow stands are important winter range for moose moving into the area seasonally from Unit 13 south of the Alaska Range.

The 4 bids solicited for this job ranged from \$64.98 to \$105.00 per acre. Once again, S & K Farms in Delta Junction submitted the lowest bid and was awarded the contact. S & K used the same bulldozer for this job as they used in Goldstream Valley during 1996. The contract portion of this project cost \$15,835.63.

PRESCRIBED BURNING PROTOCOL

A draft Prescribed Fire Protocol was prepared to support categorical exclusion of our prescribed fire program from the NEPA process. Under FWS guidelines, prescribed burning is categorically excluded when state plans and procedures adequately address the environmental issues in the NEPA process. We are working with DOF to ensure this documentation accurately reflects state policies and procedures. The DOF provides authorization, permitting, risk assessment and risk management responsibility for these burns and implements them for DWC.

WILDLIFE SOCIETY WORKSHOP

During 6–10 April in Spokane, Washington, I attended a workshop entitled “Fire and Wildlife in the Pacific Northwest: Research, Policy and Management” at the 1998 Annual Northwest Section Meeting of The Wildlife Society.

PROGRESS MEETING PROJECT OBJECTIVES

Objective 1 Work with state and federal agencies and the private sector to plan, coordinate, and implement forest management activities to maintain or improve wildlife habitat

I have developed favorable working relationships with many staff at various levels in a variety of state, federal, and private organizations over the 4-year interval covered by this report. By coordinating with several cooperating entities, I have been able to: (1) successfully plan and implement many forest management activities to maintain or improve wildlife habitat that could not have been successfully completed by ADF&G staff alone; and (2) leverage project funds with funding or in-kind services from other sources to increase both the number and scope of activities completed. We have completed 9 prescribed fires, felled aspen on 25 units, crushed willows at 3 sites, planted feltleaf at 4 sites, and constructed 4.5 miles of forest access road over the 4-year period ending 1 September 1998.

Objective 2 Encourage prescribed burning and other appropriate forestry practices in developed areas to offset the negative ecological effects of increased suppression of natural fires

I continue to urge state and federal land managers to develop and fund a forest fuels management program near populated areas to function in concert with our habitat enhancement program. Prescribed burning and/or mechanical manipulation of forest fuels will help protect people and property from disastrous wildland fires and will maintain or enhance wildlife habitat values. However, a broader funding source is needed for this effort to succeed at a meaningful level due to the magnitude of the problem that has resulted from public decisions to exclude wildland fire in developed areas. It is unlikely that ADF&G funding for habitat enhancement will ever be sufficient to address this problem. It is also inappropriate for wildlife habitat enhancement funds to be the sole source of revenue for management actions with such broad public benefits. Significant progress will not be possible until fire managers and the public recognize that prescribed burning is needed for protection of human life and property and other purposes besides wildlife management.

Each of our habitat enhancement activities carries a secondary objective to reduce the risk of catastrophic wildland fire by enhancing forest diversity. Prescribed fire and mechanical treatments interject areas of young, less flammable vegetation into the forest landscape and reduce the occurrence of large expanses of continuous, highly flammable forest fuel types. Furthermore, our prescribed burning activities provide opportunities for fire managers to gain the experience and confidence necessary to use controlled fire effectively and economically to protect people and property and to meet land and resource management objectives.

I also continue to encourage foresters to develop an ecologically sound forest management regime for developed areas where the natural, recurring disturbance by wildland fire is largely excluded. This means ensuring that forestry practices protect and maintain the full biological diversity of the forest *and* that enough acreage is harvested, burned or otherwise disturbed periodically to functionally replace the natural fire regime being denied.

The postlogging slash burn in 1996 was the first of several prescribed fires planned in conjunction with timber sales in the Tanana Valley State Forest to help meet this objective and to develop experience using prescribed fire safely and efficiently to meet land and resource management objectives. This burn enhanced the natural establishment of forbs and deciduous trees and shrubs after logging.

The landscape-scale prescribed fire in 1998 was the first of several planned to help restore and maintain vegetative diversity and productivity where wildland fires have been, or continue to be, excluded because of people's desire to protect human life, property, or timber resources. Likewise, we have used felling and burning in upland aspen stands and mechanical crushing in lowland willow stands to rejuvenate aging plants and slow conversion to later succession, spruce-dominated forest.

Objective 3 Evaluate biological and economic efficacy of prescribed burning and other forestry practices for maintaining or enhancing wildlife habitat

We made some progress toward achieving this objective. Treated sites were revisited in subsequent years to measure vegetative regrowth and maintain a written and photographic record of observed changes. However, we need a more systematic and thorough evaluation of project activities. Development and implementation of a more adequate monitoring program was not possible within the limits of staff time and program priorities. One of the 2 positions assigned to this project has been vacant since early 1997.

We reviewed the literature on vegetation sampling and developed a preliminary sampling protocol. We plan to implement a more thorough evaluation of the biological effects of project activities based on this review when full staffing is restored in 1999 and program priorities are reassessed.

The postlogging prescribed fire in an upland white spruce clearcut demonstrated that broadcast burning of slash can reduce competition from joint grass, increase the establishment of herbaceous plants and deciduous tree seedlings, and ease planting of white spruce seedlings and willow cuttings. However, the underlying permafrost, wetter surface conditions, and less flammable slash at the lowland birch and willow sites did not produce a severe enough fire to expose seed beds and reduce joint grass competition.

The felt-leaf willow cuttings have not survived well in the logged upland white spruce stands. Survival over the first winter improved after planting procedures were modified and quality control was improved. However, after the second winter, few cuttings remained alive. A review of our procedures with willow expert Roseann Densmore (U.S. Geological Survey, Biological Research Division, Anchorage Alaska, USA) identified several potential problems that we will attempt to reduce or eliminate during future planting trials.

The shear blade equipped bulldozer proved to be an efficient and cost-effective way to cut small diameter aspen trees to encourage root suckering, but it tended to uproot or split similar sized, but harder, birch trees. Operated at ground level, the shear blade caused root crown damage and

reduced sprouting in birch and willow. A bulldozer with a standard blade produced better results where only willow was present.

Our initial observations following spring burning of standing aspen were encouraging. We will continue to monitor aspen root suckering in the test burns and compare observed responses with those obtained using mechanical felling.

SEGMENT PERIOD PROJECT COSTS

	<u>Personnel</u>	<u>Operating</u>	<u>Total</u>
Planned	51.9	197.1	249.0
Actual	77.7	55.2	132.9
Difference	-25.8	141.9	116.1

Explanation: Allocations are for activities extending through 30 June 2001. Many of the planned activities have not been completed. Actual personnel costs exceeded the planned costs because the latter only included DWC personnel. We were unable to predict how much of the RSAs to DOF would be used for personnel costs.

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APPENDIX 1 SUMMARY OF EXPENSES FOR THE WILDLIFE HABITAT ENHANCEMENT PROJECT

APPENDIX 2 RSA TO ADNR/DOF FOR LANDSCAPE SCALE PRESCRIBED FIRES

APPENDIX 3 RSA TO ADNR/DOF FOR OTHER HABITAT ENHANCEMENT PROJECTS